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#### Lessons in Electricity.

BY PROF. TINDALL, F. R. S.

##### II.

**SEC. 8. *Electrics and Non-Electrics.***—For a long period, bodies were divided into *electrics* and *non-electrics*, the former deemed capable of being electrified, the latter not. Thus the amber of the ancients, and the spars, gems, fossils, stones, glasses and resins, operated on by Dr. Gilbert, were *electrics*, while all the metals were *non-electrics*. We must now determine the true meaning of this distinction.

Take in succession a ball of brass, of wood coated with tin-foil, a lead bullet and an apple, in the hand, and stroke them briskly with silk, flannel, or the fox's brush; none of them will attract the balanced lath (Fig. 4,) or show any other symptom of electric excitement. All of them, therefore, would have been once called *non-electrics*.

But suspend them in succession by a string of silk held in the hand, and stroke them again; every one of them will now attract the lath.

Reflect upon the meaning of this experiment. We have introduced an insulator—the silk string—between the hand and the body struck, and we find that by its introduction the *non-electric* has been converted into an *electric*.

The meaning is obvious. When held in the hand, though electricity was developed in each case by the friction, it passed immediately through the hand and body to the earth. This transfer being prevented by the silk, the electricity, once excited, is retained, and the attraction of the lath is the consequence.

In like manner, a brass tube, held in the hand and struck with a fox's brush, shows no attractive power; but when a stick of sealing wax, ebonite, or gutta percha is thrust into the tube as a handle, the striking of the tube at once develops the power of attraction.

And now you see, more clearly than you did at first, the meaning of the experiment with the heated foolscap and India rubber. Paper and wood always imbibe a certain amount of moisture from the air. When the rubber was passed over the cold paper, electricity was excited, but the paper, being rendered a conductor by its moisture, allowed the electricity to pass away.

Prove all things. Lay your cold foolscap on a cold board, supported by warm dry tumbler, pass your India rubber over the paper; lift it by a loop of silk, for if you touch it it will discharge itself. You will find it electric: and with it you can charge your electroscope, or attract from a distance your balanced lath.

The human body was ranked among the *non-electrics*. Place upon the ground four warm glass tumblers, and upon the tumblers a board. Stand upon the board, and present your knuckle to the lath. A single stroke of the fox's fur, if skillfully given, will produce attraction. If you stand upon a cake of resin, of ebonite, or upon a sheet of good India rubber, the effect will be the same.

Throw a maskintosh over your shoulders, and let a friend strike it with the fox's brush, the attractive force is greatly augmented.

After brisk striking, present your knuckle to the knuckle of your friend. A spark will pass between you.

This experiment with the maskintosh further illustrates what you have already frequently observed, namely, that it is not friction alone, but the friction of special substances against each other, that produces electricity.

Thus we prove that *non-electrics*, like *electrics*, can be excited, the condition of success being, that an insulator shall be interposed between the *non-electric* and the earth. It is obvious that the old division into *electrics* and *non-electrics* really meant a division into *insulators* and *conductors*.

**SEC. 9. *Discovery of Two Electricities.***—We have hitherto dealt almost exclusively with electric attractions, but in an experiment already referred to, Otto von Guericke observed the repulsion of a feather by his sulphur globe. I also anticipated matters in the use of our Dutch gold electroscope, where the repulsion of the leaves informed us of the arrival of the electricity.

Du Fay, who was the real discoverer here, found a gold-leaf floating in the air to be at first attracted and then repelled by the same excited body. He proved that when it was repelled by rubbed glass, it was attracted by rubbed resin, and that when it was repelled by rubbed resin, it was attracted by rubbed glass. Hence the important announcement, by Du Fay, that there are two kinds of electricity.

The electricity excited on the glass was for a time called "*vitreous*" electricity, while that excited on the sealing wax was called "*resinous*" electricity. These terms are, however, improper, because, by changing the rubber, we can obtain the electricity of sealing-wax upon glass, and the electricity of glass upon sealing-wax.

Roughen, for example, the surface of your glass tube, and rub it with flannel, the electricity of sealing-wax will be found upon the vitreous surface. Rub your sealing-wax with vulcanized India rubber, the electricity of glass will be found upon the resinous surface.

We now use the term "*positive*" electricity to denote that developed on glass by the friction of silk, and "*negative*" electricity to denote that developed on sealing-wax by the friction of flannel. These terms are adopted purely for the sake of convenience. There is no reason in nature why the resinous electricity should not be called *positive*, and the vitreous electricity *negative*. Once agreed, however, to apply the terms as here fixed, we must adhere to this agreement throughout.

**SEC. 10. *Fundamental Law of Electric Action.***—In all the experiments which we have hitherto made, one of the substances has been electrified by friction, and the other not. But, once engaged in inquiries of this description, questions incessantly occur to the mind, the answering of which extends our knowledge and suggests other questions. Suppose, instead of exciting only one of the bodies presented to each other, we were to excite both of them, what would occur? This is the question which was asked and answered by Du Fay, and which we must answer for ourselves.

Here your wire loop (Fig. 1) comes again into play. Place an unrubbed gutta percha tube or a stick of sealing-wax in the loop, and be sure that it is unrubbed—that no electricity adheres to it from former experiments. If it fail to attract light bodies, it is unexcited; if it attract them, pass your hand over it several times, or, better still, pass it over or through the flame of a spirit lamp or candle. This will remove every trace of electricity. Attract the unrubbed gutta percha tube by a rubbed one.

Remove the unrubbed tube from the loop, and excite it with its flannel rubber. One end of the tube is held in your hand, and is therefore unexcited. Return the tube to the loop, keeping your eye upon the excited end. Bring a second rubbed tube near the excited end of the suspended one; strong repulsion is the consequence. Drive the suspended tube round and round by this force of repulsion.

Bring a rubbed glass tube near the excited end of the gutta percha tube; strong attraction is the result.

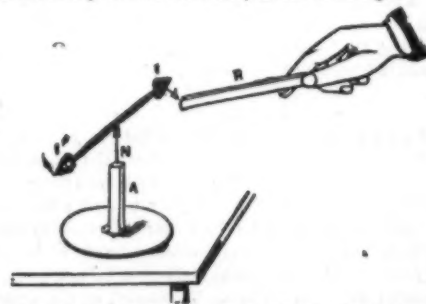
Repeat this experiment step by step with two glass tubes. Prove that the rubbed glass tube attracts the unrubbed one. Remove the unrubbed tube from the loop, excite it by its rubber, return it to the loop, and establish the repulsion of glass by glass. Bring rubbed gutta percha or sealing wax near the rubbed glass; strong attraction is the consequence.

These experiments lead us directly to the fundamental law of electric action, which is this: Bodies charged with the same electricity repel each other, while bodies charged with opposite electricities attract each other. Positive repels positive, and attracts negative. Negative repels negative, and attracts positive.

Devise experiments which shall still further illustrate this fundamental law. Repeat, for example, Otto von Guericke's experiment. Hang a feather by a silk thread, and bring your rubbed glass tube near it; the feather is attracted, touches the rod, charges itself with the electricity of the rod, and is then repelled. Cause it to retreat from the rod in various directions.

Hang your feather by a common thread: if no insulating substance intervenes between the feather and the earth, you can get no repulsion. Why? you ought to be able to answer. Obviously it is because the charge of positive electricity communicated by the rod is not retained by the feather, but passes away to the earth. Hence, you have not positive acting against positive at all. Why you should have the attraction of the neutral body by the electrified one will, as already stated, appear by-and-by.

Attract your straw needle by your rubbed glass rod. Let the straw strike the rod, so that the one shall rub against the other. The straw accepts the electricity of the rod, and repulsion immediately follows attraction, as shown in Fig. 7.



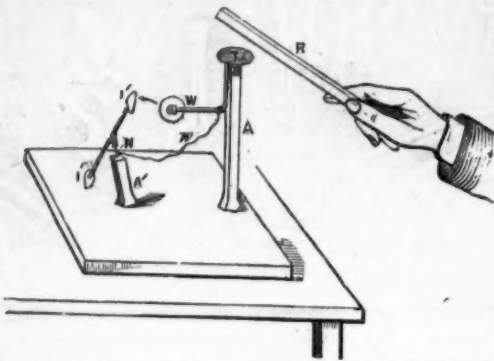
Mr. Cottrell has devised the simple electroscope represented in Fig. 8 to show repulsion. A is a stem of sealing wax, with a small circle of tin, T, at the top. W is a bent wire proceeding from T, with a small disk attached to it by wax. I is a little straw index, supported by the needle, N, as shown in the figure. The stem, A, is not quite vertical, the object being to cause the bit of paper, I, to rest close to W, when the apparatus is not electrified. When electricity is imparted to T, it flows through the wires, W and to, over both disk and index; immediate repulsion of the straw is the consequence.

No better experiment can be made to illustrate the self-repulsive character of electricity; than the following one: Heat your square board again, and warm, as before, your sheet of foolscap. Spread the paper upon the board, and excite it by the friction of India rubber. Cut from the sheet two long strips with your penknife. Hold the strips together at one end. Separate them from the board, and lift them into the air; they forcibly drive each other apart, producing a wide divergence.

Cut several strips, so as to form a kind of tassel. Hold them together at one end. Separate them from the board, and lift them into the air; they are driven asunder by the self-repellent electricity, presenting an appearance which may remind you of the hair of Medusa. The effect is represented in Fig. 9. And now you must learn to determine with certainty the

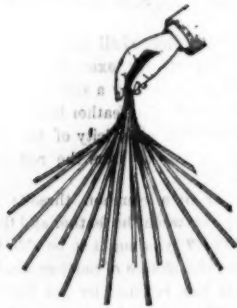


quality of electricity with which any body presented to you may be charged. You see immediately that attraction is no sure test, because unelectrified bodies are attracted. Further on you will be able to grapple with another possible source of error in the employment of attraction.



In determining quality, you must ascertain, by trial, the kind of electricity by which the charged body is repelled; if, for example, any electrified body repel, or is repelled by, sealing-wax rubbed with flannel, the electricity of the body is negative; if it repel, or is repelled by, glass, rubbed with silk, its electricity is positive. Du Fay had the sagacity to propose this mode of testing quality.

Apply this test to the strips of foolscap paper excited by the India rubber. Bring a rubbed gutta percha tube near the electrified strips, you have strong attraction. Bring a rubbed glass tube between the strips, you have strong repulsion and augmented divergence. Hence, the electricity, being repelled by the positive glass, is itself positive.



SEC. 11. *Double or "Polar" Character of the Electric Force.*—We have examined the action of each kind of electricity upon itself, and upon the other kind; but hitherto we have kept the rubber out of view. One of the questions which inevitably occur to the inquiring scientific mind would be, How is the rubber affected by the act of friction? Here, as elsewhere, you must examine the subject for yourself, and base your conclusions on the facts you establish.

Test your rubber, then, by your balanced lath. The lath is attracted by the flannel, which has rubbed against gutta percha; and it is attracted by the silk, which has rubbed against glass.

Regarding the quality of the electricity of the flannel or of the silk, the attraction of the lath teaches you nothing. But suspend your rubbed glass tube, and bring the flannel rubber near it; repulsion follows. The silk rubber, on the contrary, attracts the glass tube. Suspend your rubbed gutta percha tube, and bring the flannel rubber near it; repulsion follows. The silk rubber, on the contrary, attracts the tube.

The conclusion is obvious; the electricity of the flannel is positive, that of the silk is negative.

But the flannel is the rubber of the gutta percha, whose electricity is negative, and the silk is the rubber of the glass, whose electricity is positive. Consequently, we have not only proved the rubber to be electrified by the friction, but also proved the electricity of the rubber to be opposite in quality to that of the body rubbed.

SEC. 12. *What is Electricity?*—Thus far we have proceeded from fact to fact, acquiring knowledge of a very valuable kind. But facts alone cannot satisfy us. We seek a knowledge of the principles which lie behind the facts, and which are to be discerned by the mind alone. Thus, having spoken, as we have done, of electricity passing hither and thither, and of its being prevented from passing, hardly any thoughtful boy or girl can avoid asking, What is it that thus passes?—what is electricity? Boyle and Newton betrayed their need of an answer to this question when the one imagined his unctuous threads issuing from and returning to the electrified body, and when the other imagined that an elastic fluid existed which penetrated his rubbed glass.

When I say "imagined" I do not intend to represent the notions of these great men as vain fancies. Without imagina-

tion we can do nothing here. By imagination I mean the power of picturing mentally things which have an existence as real as that of the world around us, but which cannot be touched directly by the gross bodily organs of sense. I mean the purified scientific imagination, without the exercise of which we cannot take a single step into the region of causes and principles.

It was by the exercise of the scientific imagination that Franklin devised the theory of a single electric fluid to explain electrical phenomena. This fluid he supposed to be self-repulsive, and diffused in definite quantities through all bodies. He supposed that when a body has more than its proper share it is positively, when less than its proper share, it is negatively electrified. It was by the exercise of the same faculty that Symmer devised the theory of two electric fluids, each self-repulsive, but both mutually attractive.

At first sight Franklin's theory seems by far the simpler of the two. But its simplicity is only apparent. For though Franklin assumed only one fluid, he was obliged to assume three distinct actions. Two of these were the mutual repulsion of the electric particles among themselves, and the mutual attraction of the electric particles and the ponderable particles of the body through which the electricity is diffused. These two assumptions, moreover, when strictly followed out, lead to the unavoidable conclusion that the material particles must also mutually repel each other. Thus the theory is by no means so simple as it appears.

The theory of Symmer, though at first sight the most complicated, is in reality by far the simpler of the two. According to it, electrical actions are produced by two fluids, each self-repulsive, but both mutually attractive. These fluids cling to the atoms of matter, and carry the matter to which they cling along with them. Every body, in its natural condition, possesses both fluids in equal quantities. As long as the fluids are mixed together they neutralize each other, the body in which they are thus mixed being in its natural or unelectrical condition.

By friction (and by various other means) these two fluids may be torn asunder, the one clinging by preference to the rubber, the other to the body rubbed.

According to this theory, there must always be attraction between the rubber and the body rubbed, because, as we have proved, they are oppositely electrified. This is in fact the case. And mark what I now say. Over and above the common friction, this electrical attraction has to be overcome whenever we rub the glass with silk, or sealing wax with flannel.

You are too young to fully grasp this subject yet, and indeed it would lead us too far away to enter fully into it. But I will throw out for future reflection the remark that the overcoming of the ordinary friction produces heat then and there upon the surfaces rubbed, while the force expended in overcoming the electric attraction may be converted into a spark which shall appear a thousand miles away from the place where it was generated.

Theoretic conceptions are incessantly checked and corrected by the advance of knowledge, and this theory of electric fluids is doubted by many scientific men. It will, at all events, have to be translated into a form which shall connect it with heat and light, before it can be accepted as complete. Nevertheless, keeping yourselves unpledged to the theory, we shall find it of exceeding service both in unraveling and in connecting together electrical phenomena.

### Teaching Power.

WE have already fixed upon a unit of measurement for mechanical power. Is it possible to secure a unit of comparison for that intellectual force which we call teaching power? We fear not, although there are enormous differences between the powers possessed by different teachers. Suppose we attempt to define a little more closely, however that is a rather indefinite term "aptitude to teach."—What is the peculiar something that makes one man a teacher, and the lack of which makes another equally industrious, equally honest and conscientious man, a mere hearer of lessons, a helpless teller, and no teacher at all? Well, we need not expect to tell exactly why one ripe pear is sweet and delicious, while another on the same branch is tasteless as a turnip. There are, however, certain elements of good teaching that may be cultivated and have their power intensified. One of prime importance is the power of arresting attention. Some good teachers do this in one way, some in another; some pleasantly, others with a strong dash of sharpness and acerbity; some quietly and cheerily, others boisterously and with noisy energy, ("polupholisolo thal-lases"), but they all do it by some means. Those who succeed in doing it so that the pupils cannot tell exactly why their attention is sustained, but only that it is constantly sustained, are undoubtedly the most skillful teachers. Also, great forces are seldom noisy. The sun holds the solar system in order and makes no fuss, takes on no upstartish airs, does not even strut and swagger, utters no sound, but goes

on about his business and smiles gladness and good humor into his whole empire. So, we think, all other things being equal, the quietest teacher is the most powerful.

Another chief element of teaching power is the faculty of setting pupils to work for themselves. All education is really and truly self-education. Strictly, and truly, we cannot educate a child at all. We can only put him in the most favorable environment of circumstances, and stimulate him to such mental action as shall lead him to educate himself. Every good teacher has a distinct influence over his pupils in stirring up their curiosity, exciting deep interest in study for its own sake, and in cultivating that love of independent action which leads the pupil to reject assistance until he has exhausted all his own resources in vain. This power soon converts lagging slaves into earnest wide-awake inquirers, emulating each other in the race to be discover truth for themselves. The price of it cannot be found in the market reports, but every one may cultivate it by careful study and keen observation. One main feature of its exercise is the tact necessary to induce pupils to face difficulties with dogged, plodding perseverance, in entire anticipation of the teacher's explanations. Here is the essential point, the very touchstone of good teaching, viz., not only to supply the daily bread of instruction, but also to produce in the pupil a voracious appetite for this very food, ere it is set before him. There is no nausea, no ennui, no lassitude and indifference when the pupil has already grappled with the difficulty, wrestled with it mightily, and found himself just too weak to overcome it.

The highest degree of teaching power may and ought to co-exist with light-hearted cheerfulness. The sour-visaged Pharisee, who is too great a man, too dignified a personage to smile, or perpetrate a little joke now and then, had better take himself off at once. He is not wanted about the school by the pupils. He is the natural born enemy of their frolicsome dispositions. He is an iceberg stranded in a flower garden, chilling all the beauty and brightness out of the happy flowers, and freezing up the music in the very throats of the joyous birds. On the other hand, the flippant chatterbox, whose well-worn witticisms all the class know by heart, who cannot help talking incessantly, will not inspire that earnest enthusiasm which is the soul of all teaching worthy of the name.

The last element we shall touch upon is the marvellous power of laborious industry and patient forbearance. All great movements require considerable time to gather momentum. The touch of genius cannot educate a hearty boy in a day. The work must be measured by years, not by days. The public, and also the teach himself, must be habituated to patient waiting for fruitful results. "First the blade, then the ear, then the full corn in the ear."—C. CLARKSON.

### Influence of Character on Education.

"Behind the work of every great orator, artist or poet, there hangs the shadowy prophecy of something nobler unaccomplished, something sublimer unwritten. So in the life of every good teacher there is something better than the lesson he has taught, something nobler than the words of instruction he has spoken. Who has ever walked through the close at Rugby, or seen the oak pulpit rising above the seats in the little chapel, that has not felt the silent presence of one whose life was far better than any lesson in classic lore he ever gave, grander than any sermon he has ever preached. Ah, my friends, this magnetic sympathy is more than intellectual attainment, better than culture, higher than genius. Its allies are the divine and the eternal. Would we know its power we must become humble students of the Divine Master. I once stood at the close of an autumn day, on the top of a lofty eminence, just as the shade of evening were beginning to gather over the landscapes. Before me was spread out that great plain which for thirty-five centuries has been the battle-field of the world—on which Saul and Gideon, the Crusaders and Napoleon, fought for supremacy. Just before me rose the beautiful Mount of Transfiguration; on the left, embosomed in the surrounding hills, lay the quiet sea, on and around which were performed most of the mighty works of him who spake as man never spake. At my right stretched the mountain range on which the prophet of Jehovah confounded the priests of Baal; while directly at my feet lay the little vale where were spent the boyhood and youth of the great Teacher. Soon the darkness of night gathered all around me—Esdraelon, Tabor, Gennesaret, Carmel, Nazareth faded from my sight. But the presence of him whose feet had trodden that plain; whose life is an ever-abiding inspiration; whose star for eighteen centuries has been the light of the world, seemed to overshadow me, while from out the darkness seemed to come the divine words, 'I am the way, the truth, and the life.' Teachers, when at last the shades of night have gathered around us; when the tasks we have given, the lessons we have taught, the words we have spoken, shall have been forgotten, may the silent influence of our lives



remain the bulwark of truth, the evangel of purity, the inspiration of goodness."—*Prof. Blackington at Nat. Ed. Association.*

### Labor Schools in Europe.

A remarkable report has lately been published by the University of Cambridge, England, on the subject of Industrial Education, from which we make the following interesting extracts:

Premising that since workmen cannot come to the university, it is the university's duty to go to them, it proposes to open a course of specific training, not for the so-called liberal professions, or for middlemen of any kind, but for the veritable producers—in other words for the working class. This design is worthy of an institution which since the days of the Long parliament, has been outspoken in the expression of popular sympathies and steadfast in promoting reform. Since the decay of the old apprenticeship system very little has been done for the education of labor. It is plain that the establishments known under the name of ragged schools scarcely belong to the class of industrial seminaries. As their title indicates, these industrial institutions receive the children of poor parents, or orphans afford them lodging and nourishment, and employ them in various trades. The extreme youth of these children—they graduate, as a rule, at the age of 15—prevents them from receiving a substantial technical training. On the other hand considerable progress has been made in this direction by certain countries on the Continent, and some examples especially worthy of imitation are pointed in this report.

Industrial schools seem to be quite numerous in the German Empire and Austria, in Denmark, Sweden, Holland and Belgium. They are generally known as "apprentices' workshops," but they combine theoretical with practical instruction, and presuppose graduation from primary schools. In Belgium pupils are admitted from the age of 13, or even earlier, if they can show the requisite measure of elementary knowledge.

In Holland the most important technical academies for the producers are those of Amsterdam. The school for boys, founded in 1864 by the "Society of the Working classes," was designed to train workmen for those trades which are connected with architecture and ship-building. The course of instruction lasts three years, and includes—besides certain studies supplementary of primary acquirements—the elements of metrics of mechanics and natural history, the art of drawing, the study of tools and materials, carpentry masonry, the use of the lathe and the forge. The pupils must be at least thirteen years of age, and have received a good elementary education. They are required to pay an annual fee, which does not exceed, however, \$13. There is likewise a training school for girls in Amsterdam, whose management has been attended with good results, because it has avoided the common error of wasting time on lady-like accomplishments.

In Scandinavia and the German Empire, the apprentice schools differ only in some details of small importance from those above described. We merely note that they are government institutions, whereas in Vienna, Prague, and throughout Austria the industrial academies were created by private enterprise, although they received a subsidy from the State. Passing to other countries, we find the idea of technical training for the working classes has borne but meagre fruit in Switzerland, although the system of rudimentary instruction is singularly efficient.

Notwithstanding many projects brought forward at the epochs of its various revolutions, France, as a nation, has done almost nothing in the way of providing a substitute for the old system of apprenticeship which passed away with the ancient regime. She seems to have taken thought for everything except skilled labor. Her unrivalled assemblage of art, scientific and professional schools is supplemented by a score of special institutions whose graduates are qualified to direct every species of industrial and agricultural enterprise, and by number of business colleges framed on the model of the Ecole Turgot, whose pupils are fitted for the several branches of foreign and domestic trade. But of schools for workmen the State has none, if we except the establishment founded by the Sardinian Government and transferred to France upon the annexation of Savoy and Nice. It is true that a few municipalities have created apprentice schools, but their number is extremely limited. Paris has only one institution of the kind—the apprentice school of the Boulevard de la Villette. This, however, merits special attention, because, according to Professor Stuart, of Cambridge University, it presents the most perfect type of an industrial academy. We may add that at his suggestion a fac simile of it is about to be organized in England.

The simple object of this school, first opened in 1873, is to produce intelligent and skillful workmen. The specific callings for which its pupils are trained are those of workers in iron and workers in wood. Boys are admitted between

the ages of thirteen and sixteen, after an examination which has regard to orthography, arithmetic, and metric system. Not only is tuition gratuitous, but deserving students receive once a fortnight a certain compensation for their labor, varying from forty cents to a dollar. The period of apprenticeship is three years. During the first two years a day's labor six hours in the work shop and five in the class, while for the last year it means eight hours of practice with tools and three hours of study.

During the first twelve-month the pupil passes one or two months alternately in each of the specialities taught, so that he can determine which suits his taste, while the directors can observe his aptitude. Only at the beginning of the second year does the apprentice, with the advice of his parents and teachers, decide upon a given trade, to which thenceforward he devotes himself exclusively.

The creation of this school would have been impracticable during the second empire, and under the existing regime it has encountered many obstacles. Yet its progress has been remarkable. The number of apprentices, which four years ago was seventeen, is now nearly two hundred.

### The Text-Book Question.

CORONA, L. I., Jan. 10th, 1878.

At the annual meeting of this School District, Oct. 9th, 1877, a series of text-books was recommended to the meeting by the teachers of the school. A committee, for the purpose of examining and selecting a series of text-books to be used in the school, was appointed, and meeting adjourned to Nov. 2nd.

At the adjourned meeting Nov. 2nd, the committee recommended a series of text-books to the meeting, which was lost by one vote. The Trustees who had moved for this committee in this previous meeting, now offered for the consideration of the meeting, Appleton's series of text-books, which was adopted 31 to 6, and the meeting adjourned to Nov. 16th.

At the adjourned annual meeting held Nov. 16th, 1877, a resolution was offered to lay away that list of text-books and to adopt the text-books recommended by the committee of Nov. 2nd, 1877. This resolution was adopted unanimously.

Then Mr. C. W. Brown of D. Appleton & Co., wrote to ask Supt. Gilmour's decision as to the law in the case. He stated that the case was illegal and of no account. On more mature examination when applied to by the Trustees for a decision he reversed this statement to Mr. Brown, and said the change was legally affected.

The law in the case is as follows:

"When a text-book shall have been adopted for use in any of the public or common schools in this State, as provided in the first section of this act, it shall not be lawful to supersede the text-book so adopted by any other book within a period of five years from the time of such adoption, except upon a three-fourths vote of the Board of Education, or of such body as perform the functions of such Board, where such Board has made the designation, or upon a three-fourth vote of the legal voters present and voting at the annual school meeting in any other school district.

When text-books are adopted, (and it must be by a two-third vote according to the first section of the act just quoted) they cannot be superseded within a period of five years from the time of such adoption, unless by a three-fourths vote at the annual school meeting.

The following is Supt. Gilmour's decision:—At any annual Meeting a list of text-books when adopted, may be changed by the three-fourths vote of those present and voting upon the question. The meeting held in your district on the 16th of November being an adjourned annual meeting, and the vote to change the text-books having been unanimous, I am of the opinion that the change was legally effected, and that the books recommended by the committee are the ones that should be used in your school. Your obedient servant,

NEIL GILMOUR, Supt.

This seems to settle the matter in Corona. No bigger tempest was ever stirred up by text-books than this.

### The Value of Training.

EARLY in childhood, habits of self-reliance and self-help may be formed. The child should be taught to amuse itself, to wait upon itself, and to perform services, according to its strength and ability, for others. It is no kindness to a healthful child to wait upon it continually, when it is old enough to wait upon itself.

The very bird knows that. Until their younglings can fly, they bring food and put it in their mouths, but no sooner are they fledged than they are pushed from the nest by the sensible God-taught parent, and compelled to exercise their own powers in taking care of themselves.

It is surprising what mere training will do in developing

talent in children. There are those who have no aptitude for music, but persistent cultivation of the voice and ear does often make very passable musicians of those who seemingly had no talent in that direction. The same is true of drawing and painting. No child in the Boston schools is excused from drawing because he has no liking for the task. Of course, if one loves music or mathematics or geography, he will make easy and rapid advancement in those studies, but the fact that he does not like them constitutes no reason why he should not become more or less proficient in them.

There is no training that can take the place of a good home training. Those boys and girls who are so fortunate as to have fathers and mothers capable of instructing them in the performance of whatever duties, and the acquisition of whatever accomplishments make home a place to be longed for and enjoyed, are indeed fortunate. Their equipment for life is complete.

Special trainings are of great value. A lawyer of several years' standing at the bar in New York in a recent conversation remarked, "I studied law in a lawyer's office. My brother here, several years younger than myself, went through the law school, and he has so much the advantage of me in consequence of that training, in the studious habits he has formed, in being brought into immediate contact with the best legal minds, in being held to the highest standards, that this fall I shall enter the law school and take the entire course."

Self-made men, so called, subject themselves to the severest training and discipline, and do not avail themselves of collegiate and technical training simply because the force of circumstances prevents them from doing so. There was never an hour in their youth when Henry Wilson and Horace Greeley would not gladly have availed themselves of all the facilities offered by academies and colleges if they could have done so. How carefully they trained themselves.

Skilled labor is wanted everywhere; in the composing-room, in the editorial room, in the shop, at the piano, at the forge, in the kitchen. Skilled labor commands good wages, even in these hard times, but skilled labor comes and can come only by long training.

### English Titles.

ENGLISH titles are of two kinds; those which are inherited, and descend from father to son, and those which die out with the persons who hold them. One branch of the English Parliament, the House of Lords, is composed almost entirely of men who have become members of it solely by reason of inheriting a title from their ancestors.

One of the English titles which are hereditary, the highest, of course, is that of the King or Queen. Next to this comes the titles of the sovereign's children, brothers and sisters, and other relatives. The sons of the Queen have the title of prince, and when they get to be twenty-one years of age they are created royal dukes, and have a new name added to the title.

For instance, the Prince of Wales, when he came of age, was made Duke of Cornwall, though he is always called by the first designation. Prince Alfred, Victoria's second son, was made Duke of Edinburgh, and Prince Arthur, her third, Duke of Connaught, and they are so called. These titles are hereditary, and will descend to their children.

Next to the royal family come the various titles of the peers of the realm, which means those noblemen who inherit the right to sit in the House of Lords, and there legislate for the empire.

The peers of the realm are divided into five different ranks or grades. Of these, the dukes are the highest, and no English subject can bear a higher title than that of duke. The greatest generals and statesmen have found a dukedom the highest reward for their achievements. Marlborough was made a duke, and so was Wellington. There are now 21 dukes. They are addressed as Your Grace. Their eldest sons are called marquises or earls, as courtesy-titles, and their younger sons have the title of lord before their names. For instance, Lord Charles Wellesley, Lord Wm. Lennox.

The next rank below duke is that of marquis. There are at present eighteen noblemen of this grade, and their sons bear the same grade of courtesy-titles as those of dukes.

The earls come next in dignity, and of these there are no less than 112. The viscounts, who are the fourth in point of rank, comprise twenty-four hereditary nobles, and the barons, who are the lowest order of peers, number 242.

Besides these, there are Scotch and Irish peers, many of whom do not sit in the House of Lords.

The title of baronet is a hereditary one, but baronets are not noblemen, and do not sit in the House of Lords. They are addressed in this way, Sir Wm. Jones, Bart.

Independently of the titles we have described are those belonging to the different orders of knighthood. Of these orders, the Knights of the Garter are highest in dignity, and



## THE MERRY GYPSIES.

Words and Music by W. H. WALTER. 81

*f* 1. Mer-ry gyp-sies all are we, Far from Nor-wood do we come; Thus with cheer-ful song and glee

2. Thro' the wood and thro' the wild, O-ver hill and vale we come, Thus we have the hours be-guiled,

*f* 3. When the moon hangs o-ver-head, And the stars are shin-ing bright, On the heath we make our bed,

4. When the morn-ing gilds the sky, Then we rise and haste a-way; O'er the hills and plains we hie,

Oft we wan-der far from home. Tra la la la la, Tra la la, Tra la la, Tra la la, Tra la la, Tra la la.

Sing-ing in our for-est home. Tra la la la la, &c.

Watch-ing through the si-lent night. Tra la la la la, Tra la la, Tra la la, Tra la la, Tra la la, Tra la la.

Gai-ly sing-ing all the day. Tra la la la, &c.

these are always nobles of great distinction. They have the right to add the letters K. G. after their names, as, the Duke of Richmond, K. G. Other orders of knighthood are the Thistle, which is a Scotch order, and St. Patrick, an Irish order, entitling the members to use the letters K. T. and K. P., respectively, after their names. These knight-hoods are always conferred upon Scotch or Irish noblemen. There is also the Order of the Bath; this is conferred on a great number of persons, military officers, statesmen, eminent physicians, musicians and artists, and it has various grades. Those who are Knights of the Bath have the title of Sir, like baronets, and use the letters K. B. or K. C. B. after their names; thus Sir Thomas Johnson, K. C. B. None of these titles of knighthood are hereditary.—*Youth's Com-panion*.

## The Ancient Ruins of Colorado.

Prof. Hayden has given Southwestern Colorado a new interest, by discovering and describing the ancient ruins in that section and in Southeastern Utah. The fertile valleys of the Animas was densely inhabited and highly cultivated by an enlightened race of people centuries ago. The ruins of the houses, corrals, towns, fortifications, ditches, pottery-ware, drawings, non-interpretable writings, etc., show that many arts were cultivated by these prehistoric people which are now entirely lost. Their houses were built of almost every kind of stone, from small bowlders to the finest sand-stone.

The finest of these ruins, and the nearest perfect, are situated about thirty-five miles below Animas City, in a large valley fifteen miles long by seven wide, on the west side of the river. This valley has been covered with build-ings of every size, the two largest being 300 by 600 feet, and about 300 feet apart. They are built of small blocks of sandstone, laid in adobe mud, the outside walls being four feet and the inside walls from a foot and a half to three feet thick. In the lower stories are found port-holes a foot square. There are rooms now left, and walls for about four stories high are still standing. About the second story, on the west side, there was once a balcony along the length of the building. No signs of a door are visible in the outer walls, and the ingress must have been from the top, in the inside there being passages from room to room. Most of them are small, from eight by ten to twelve by fourteen feet, the doors being two by four feet. The arches over the doors and port-holes are made of small cedar poles two inches wide, placed across, on which the masonry is placed. The sleepers supporting the floors are of cedar, about eight

inches thick, and from twenty to fifty feet long, and about three feet apart. A layer of small round poles was placed across the sleepers, then a layer of thinly-split cedar sticks, then about three inches of earth, then a layer of cedar-bark, then another layer of dirt, then a carpet of some kind of coarse grass. The rooms that have been protected from exposure are white-washed, and the walls are ornamented with drawings and writings. In one of these rooms the impression of a hand dipped in whitewash, on a joist, is as plain as if it had been done only yesterday. In another room there are drawings of tarantulas, centipedes, horses and men.

"In some of the rooms have been found human bones, bones of sheep, corn-cobs, goods, raw-hides, and all colors and varieties of pottery-ware. These two large buildings are exactly the same in every respect. Portions of the buildings plainly show that they were destroyed by fire, the timbers being burned off and the roofs caved in, leaving the lower rooms entirely protected. The rock that these buildings were built of must have been brought a long way, as nothing to compare with it can be found within a radius of twenty miles. All the timber used is cedar, and has been brought at least twenty-five miles. Old ditches and roads are to be seen in every direction. The Navajo Indians say, in regard to these ruins, that their fore-fathers came there five old men's ages ago (500 years), and that these ruins were here, and the same then as now, and there is no record whatever of their origin."

THERE are numerous remarkable and historic trees, among which are the bread-fruit tree of Ceylon, the fruit of which is baked and eaten as we eat bread, and is equally good and nutritious. In Barbuda, South America, is a tree which, by piercing the trunk, produces milk, with which the inhabitants feed their children. In the interior of Africa is a tree which produces excellent butter. It resembles the American oak, and its fruit, from which the butter is prepared, is not unlike the olive. The great traveler, Park, declared that the flavor surpassed any made in England from cow's milk. At Sierra Leone is the cream fruit tree, which is quite agreeable in taste. At Table Bay, near the Cape of Good Hope, is a small tree, the berries of which make excellent candles. It is also found in the Azores. The vegetable tallow tree also grows in Sumatra; and the bark of a tree in China produces a beautiful soap. The talipot tree in Ceylon grows to the height of 100 feet, the leaf of which is so large that it will cover nearly twenty people, like an umbrella. The banyan tree is wonderful; it never dies and is constantly extending, for, as the branches shoot down-

ward, they take root, and thus produce other trees, whose branches in like manner extend onward, and resemble large oaks, the fruit of which is much like rich scarlet figs, and fur-nishes a luxurious subsistence to monkeys and birds of every description. The pipul tree is said to be "the most complete-ly beautiful of all which adorn the wide garden of nature." The Hindoos call it the "tree of God," and the "religious fig," because under its shade they suppose their god Vishnu was born. It is held in such veneration that the form of the leaves is only allowed to be painted on furniture used by their Princes. They plant them as memorials of persons deceased: they serve also for shade for travellers.

A WHALING steamship, the Vega, has been bought for the Swedish Arctic Expedition, which is to start next July from Gothenburg. The vessel is very strongly built, and can carry coal enough for a cruise of 8,000 miles; she is to be supplied with sufficient provisions for three years. Captain Palander will be in command; less than thirty persons will be on board, in all three or four will constitute the scientific corp. The king of Sweden, the Government, Oscar Dickson, of Gothenburg, and Mr. Sibiriakoff (a Russian), conjointly defray the expenses. The projected voyage will be eastward from Novaya Zemlya, along the Siberian coast, down through Behring Strait; coming back around Asia and via the Suez Canal. This will circumnavigate both Europe and Asia.

COFFEE.—At the time Columbus discovered America, coffee had never been known or used. It only grew in Arabia, or upper Utopia. The discovery of its use as a beverage is ascribed to the Superior of a monastery in Arabia, who, desirous of preventing the monks from sleeping at their nocturnal ser-vices, made them drink an infusion of coffee, on the reports of shepherds, who observed that their flocks were more lively after browsing on the fruit of that plant. Its reputation spread through the adjacent countries, and in about two hundred years it had reached Paris. A single plant brought there in 1714, became the parent stock of all the French coffee plantations in the West Indies. The Dutch introduced it into Java and, the East Indies, and the French and Spanish all over South Amer-ica and the West Indies. The extent of the consumption now can hardly be realized. The United States alone annually con-sumes it at the cost, on its landing, of from fifteen to sixteen million dollars.

MR. WILLIAM MIDDLEMORE has provided a play ground for the children of the poor at Birmingham, at an expense of \$60,000. It includes four and a half acres. The same gen-tlemen has maintained for some years a home for the recla-mation of what an English exchange calls "gutter chil-dren," and has sent some hundreds of them to homes in Can-ada.



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NEW YORK, JANUARY 19, 1878.

This copy of the NEW YORK SCHOOL JOURNAL may possibly fall into the hands of one who is not a subscriber; consider then, that a piece of good fortune has befallen you, and send in your subscription at once. If you are teacher and are a subscriber to no educational paper, you do yourself an injury you have no right to do. It may be set down as an undeniable fact that every "live teacher" takes an educational paper. A small fund has been placed in our hands to send the JOURNAL to those who are too poor to afford it; that number we hope is not very large.

THERE is one point in which the Board of Education has made a decided gain, although it gets less money—the money is given in bulk and the Commissions can expend it as they see fit—all for salaries if they choose. There are ways in which decided saving can be made—especially in respect to the incidental expenses of each school. In some way we believe the sum can be so handled that no reduction of salaries need be made.

WILLIAM WOOD, President of the N. Y. City Board of Education, gives his opinion in a very clear and decided form in favor of "Higher Education." There will be a considerable debate on this subject in this city, for here the system has been fully adopted. The City College and the Normal College furnish free, a complete education for the young man or woman who desires them. The excellence of these institutions is conceded. The point made by those who object, is that "Higher Education" is not necessary to make a good citizen, and that this is all that is proposed by free public schools. Many assaults have been made on this position, and yet a strong body claim that it stands as firm as ever.

If the majority of a community desire the adaption of a "Course of Study" that embraces the higher branches of knowledge, there can be no objection, certainly no more than to other expenditures. The advantage is wholly on the side of the poor, and not of the rich, as is claimed by money. That a city like New York, for example, gets back more than it expends in this direction must be plain to any one who looks into the matter. The cost of the tuition of 2,500 young men and women is about \$250,000 annually or \$100 each; this is probably an over-estimate. It is not a large sum, certainly, when aggregated with

the primary and secondary education as it should be, the cost of each pupil is but slightly raised above what it would be if these higher institutions did not exist.

THE NEW YORK SCHOOL JOURNAL. A Splendid Premium: Webster's \$12. Unabridged Dictionary, free. The JOURNAL makes to its subscribers this extraordinary offer. It will give them a copy of the great standard Webster's Unabridged Dictionary, in leather binding, 1,836 quarto pages, with 3,000 engravings, for twelve subscribers and \$24.—being only twice as much as the cost of the Dictionary alone at any book-store! The papers are started at once on receipt of the money, and the Dictionary is promptly forwarded by the publishers by express. Any one who wants a dictionary can thus easily obtain it. Send on the names as fast as obtained; they need not all come from one Post-office. Or send sixty subscribers to the SCHOLARS' COMPANION at Fifty Cents each.

THE publishers of the NEW YORK SCHOOL JOURNAL desire us to remind subscribers who wish to stop their paper that they should notify them to that effect, as the paper is sent until a discontinuance is ordered. Do not say to the post-man that "your time is run out," etc, and put him to the trouble of notifying us. And, again, do this properly. The right way is to write a letter or postal card—be sure to see that arrears are paid up. We notify every one at the time of expiration by sending a bill for the succeeding year in the paper. We have had a few subscribers, who, six months after such a notice send in a request for discontinuance, without settling up the arrears. This is wrong. The great majority do differently; they enclose the amount due, with request for discontinuance. Some are nice and conscientious enough to pay for even one number. The best way is to deal frankly with the publishers. If you cannot pay for it until February, March or May, write to us and say so. There are some who go on year after year and put us to a great deal of trouble. Friends fix these matters right and then go ahead.

## Dr. Lambert.

Mr. T. S. Lambert, late president of the American Popular Life Insurance Company, was lately sentenced to spend five years in the State Prison at hard labor for perjury. Our acquaintance with this gentleman has been exceedingly slight, and we allude to the case only because he has been identified considerably with education, and has been known to a good many of the teachers of the State of New York. When a man goes down some laugh at the figure he makes, some moralize and say "good-enough for him" and others give him a kick. We have neither laughs morals or kicks. He was convicted of perjury in swearing that a report of his Insurance Company was true, when it was false, and yet we doubt whether Dr. Lambert did it because he had an excess of lie in him. He was subjected to the strain of a great temptation and gave way; his sin was a sin of weakness, hence the important place in the Lord's Prayer of "Lead us not into Temptation." During the last twenty years, and notably the last ten, there has been a great struggle to get money; the public have praised the money maker; the trustee and school teacher has held the money getter up an example for the scholars, and visions of wealth have floated before the poorly paid instructor. In the struggle to get this money, so as to own houses, lands, stock, and bonds, so as to put better clothes, furs and jewels on themselves, their wives and children, a good many have been obliged to throw away honesty and straight dealing. Men have found themselves, as the financial storm increased, likely to founder, and rather than do that have preferred to lie. Now a lie under some circumstances is much worse than under others. Dr. Lambert believed he could save his Insurance Company, which was in desperate shreds, by lying and did so. We look at it as an error of judgment rather than of heart in a man who saw no other way out of his straits. Of course he ought not; of course. Yet he has and we do not wish to judge him harshly. What any of us would do in temptation we know not.

Dr. T. S. Lambert has been often seen at the N. Y. State Teacher's Association, beginning in 1851 with a lecture on Physiology; he afterward lectured on the same subject before the County Institute and in 1853 published a Biology which became somewhat popular, also charts. In 1855 the

American Popular Life Insurance Company was organized with him as its president and James Cruikshank as its Secretary, and hence many teachers took out policies. It seemed to have popularity at first, but during the past three years it has had no success and has been unable to meet its death claims. To manage affairs so that the Company should appear to be sound, Dr. Lambert resorted to statements that were deceptive and he was tried and convicted.

Dr. Lambert has lost the sympathy he would have had if he had promptly acknowledged his errors and misstatements. He did not seem to feel that he had grievously erred, and so went to his punishment without carrying the sympathy that went with School Trustee Case a few days previously.

## NEW YORK CITY.

## New York Board of Education.

The Commissioners met Jan. 11, Present. Messrs. BEARDSLEE, BAKER, BELL, HAZELTINE, GOULDING, HALSTED, TRAUD, WALKER, WATSON, WEST, WHEELER, WICKHAM, KELLY, VERMILYE, MANNIERE, and KATZENBERG. Absent—Messrs. DOWD, DONNELLY, COHEN, PLACE, and JELLIFFE.

## COMMUNICATIONS.

The Corporation Counsel Whitney sent in an opinion that the By-Laws of the Board of Education in force in 1877, are not still in force.

From Trustees of the 19th Ward, asking the reconsideration of its action in reference to the transfer of Mrs. Waterman; from 11th, to purchase lot; from 8th, nominating Mrs. E. T. Kilmer for Principal of E. S. 88; from 22nd, asking that Miss O'Keefe's salary be the same for 1878 as in 1877; from 1st, to continue Miss Fanning in office as 5th assistant teacher, also nominating the present teachers in the evening schools to serve until the end of the evening school term.

From Dr. W. M. Pratt, asking payment of \$36.00 for his services on Richard Palmer, a pupil in P. D. G. S. 14, Benjamin Wood and Rev. C. Duffie ask that it be paid from the fine imposed on Miss Meyers.

On the opinion of the Corporation Counsel considerable debate arose. Mr. Watson moved it be laid on the table, as he did not consider it good law. Mr. Kelly said that this was not courteous after having requested an opinion. It was finally ordered to be entered in full on the minutes. Mr. Halsted moved that it be made the special order for the next meeting. Mr. Wickham moved the next meeting take place on the 23rd, to consider the appropriations for 1878, which was adopted.

## RESOLUTIONS.

Mr. Wickham asked that the City Superintendent be requested to report whether in his judgment, there is any necessity for the further continuance of a Senior and Junior Departments in G. S. 41; also whether there is any necessity for a further continuance of G. S. Nos. 5 and 21, and whether a consolidation of the Boys and Girls department in one building, and the primaries in the other cannot be effected without detriment to the school.

Mr. Walker, by resolution, stated that there was in the City Treasury \$9,000 of the appropriation for salaries for 1877 and asked that this be distributed to restore and repaying as far as it will go the percentage deducted from the salaries of teachers in 1877. Adopted unanimously.

## FINANCIAL STATEMENT FOR 1877.

Total Balances for '74, '75, '76.	\$361,751.66
For salaries of Teachers and others \$3,700,000.	
" supplies, rents, fuel, etc.	450,000.
" sites and buildings.	300,000.
" Corporate Schools.	103,000.
	\$3,553,000.00

Total.	\$3,914,751.66
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## PAYMENTS.

Payments on account of 1875.	\$7,015 00
" " " 1876.	194,877 85
" " " 1877.	3,316,889 50

## IN 1877.

For salaries of teachers in grammar and primary schools.	2,273,032 08
Salaries of professors, etc., in Normal College.	87,163 10
" " teachers, etc., in evening schools.	83,597 02
" " " colored.	38,066 80
" " superintendents, clerks, etc.,	76,554 86
Books and other supplies.	155,221 74
Compulsory education, agents, etc.,	19,278 13
Nautical School.	25,908 00
Corporate schools.	103,000 00

Payments for 1877.	\$3,316,889 50
Balance with Comptroller.	395,832 33

PRESIDENT WOOD'S ADDRESS, JAN. 9, before the Board of Education.

Gentlemen—I thank you for this renewed instance of your confidence by electing me for a third time to the office of President.

We have had to struggle during the past year with a reduced budget in the face of a large access of scholars to the schools. For the year 1877, we were allowed \$335,832 less than we asked for.

The only radical change which has taken place in the arrangements for the management of the schools is the abolition for the future of vice-principals in all the departments. This was adopted as a by-law Nov. 7, 1877.



To manage the schools efficiently in 1878, which is really true economy, we asked for \$3,949,800, and were granted \$3,400,000, a reduction of \$549,800.

We were repeatedly assured by members of the Board of Estimate and Apportionment that they were friends and not enemies of the common schools, and that their asking of the expenses could be reduced in any way without impairing their efficiency, was in love, and not from dislike. While the professions do not well agree with the practice, it is satisfactory to learn that Mayor Ely is not in favor of reducing the salaries of teachers.

It is curious to trace the bit-by-bit attacks, upon the efficiency of our Common School system, for I believe that just in proportion to the reduction in our various budgets is the reduction of the efficiency of our schools, looking to the future as well as to the present.

Year.	Asked for.	Granted.	Reduction.	No. Pupils.
1874	\$3,934,500.	\$3,919,086.	\$15,414.	96,249.
1875	3,883,000.	3,583,000.	100,000.	99,090.
1876	3,796,500.	3,653,000.	143,500.	103,690.
1877	3,888,352.	3,553,000.	335,352.	108,270.
1878	3,949,800.	3,400,000.	549,800.	

And thus it appears that while the attendance of scholars has been constantly increasing, the power of this Board to provide additional accommodations for them has been yearly curtailed by the reductions made in the moneys granted for school purposes. The friends of common schools, unsectarian education, under these circumstances, may well feel alarmed and anxious, especially after the blast which Governor Robinson gave in his inaugural message of January, 1877, against the Normal Schools of the State, followed up by his animadversions upon secondary or higher education, at the public expense, in his message of 1st inst.

While every one must allow that primary education is the most important of all the branches, and that no enduring superstructure of higher education can be erected without a thoroughly good foundation of primary instruction, yet in a Republic I think it is the part of wise statesmanship to give the people that secondary or higher education, at the expense of the State or Municipality, which they themselves demand.

In a Monarchy the giving of instruction in the three "R's" may be all that the State is called upon to see that its subjects shall have, and it was in relation to education in England that Sir Wm. Curtis, Alderman of London, and a boon companion of George the Fourth enunciated his celebrated dictum regarding "reading, 'riting and 'rithmetic." It would be hopeless, there, to bring the different classes or castes of society into the Common Schools, and for in the preservation of a Monarchy with all its different ranks it is perhaps not desirable that the "middle wall of partition" between classes should be thrown down, but in a Republic it is a very different affair. Here we acknowledge no difference of rank, and there is nothing to prevent the children of the rich and the poor, the children of the direct and indirect taxpayers meeting on terms of perfect equality in the arena of the Common Schools. It should, therefore, be our object to attract the children of the direct taxpayer, the children of the wealthier classes, to our Common Schools, and this can only be done by providing them not only with a thoroughly good primary education, but also with the higher branches of education, as is in point of fact done in our Grammar Schools and in our College of the City of New York for young men and in our Normal College for young women. It is a great mistake to suppose that with thoroughly good schools and efficient colleges, the direct taxpayers would be unduly burdened, for they would, in the case supposed, send their children to the Common Schools and colleges, and thereby save the great expense of private tuition.

In order to put an end to jealousy among the citizens of foreign birth resident among us, I would suggest the propriety of considering the abolition of the teaching of German and French in the three upper grades of our Grammar Schools, and the substitution of Latin. Latin would fit both boys and girls for entrance into their respective colleges, and give them a better knowledge of the roots of their own language than either German or French.

Good schools, both for primary and secondary instruction with the two colleges kept up efficiently, would, with rapid transit, help to bring back to the city that great middle class which, during the last ten years, has been absolutely squeezed out of it, leaving here only the very rich and the very poor, and it is upon that great middle class, more than upon any other, that the safety and salvation of the Republic depends.

With regard to the primary instruction in our schools, no child should leave them without, as John Bright says, being "able to read, and to comprehend what they read, and to write in such a way that their writing can be read, and to know as much of arithmetic as will enable them to keep an account of those money transactions that they may happen to have in the course of their lives." While, at the same time, all the merit and talent of the city should, by a thoroughly good education, have the opportunity of rising if it desires, and is worthy of rising, and so be a blessing to this city and to our country.

As to future examinations for teachers, I would suggest that in addition to those subjects upon which they are now examined, as set forth in section 28, sub section 4, page 121 of the Manual, candidates should all have to pass an examination in Latin and German or French, which would give our Normal College graduates a better chance for obtaining positions as teachers than they have at present.

I have to reiterate what I said last year, that this Board should at least have a veto on the appointment and transfer of all teachers, with the absolute appointment of principals. We are held responsible for the efficient working of our whole school system, and yet have not at present the appointment of a single teacher.

We should likewise have the power to transfer teachers from ward to ward, and from school to school, should circumstances, which are continually occurring and are familiar to all of us, render such transfer necessary.

As to Ventilation, this direction from Lawrence, Kansas, is highly common-sense. Teachers are required, to give particular attention to the ventilating and warming of their rooms, and always to ventilate, except in summer, by lowering the upper sash of the window, and on no account to suffer the children to sit in draughts of cold air; and as a general rule, to cause all the windows to be opened for the free admission of air at recess, and at no time to raise the temperature of the room higher than 70 degrees Fahrenheit.

Another matter worthy the attention of the Board is the custom prevailing in some of the lower wards and the two upper wards of the city, and also in some others, of appointing teachers educated in the school to which they are appointed, unless, indeed, they have in the interval graduated at the Normal College, and even that exception is of doubtful propriety.

"Home keeping youths have ever homely wits," and it is better that young teachers be taken entirely out of the old ruts to which they have been accustomed.

In conclusion, I would say that perhaps our schools, or at least the good ones, are too much inspected. A very cursory inspection of a school of long-standing for *Excellent* scholarship and discipline ought to satisfy the City Superintendent, while on the other hand, "Good, Indifferent, or Bad" schools ought to be visited and revisited either till they are brought up to the mark, or their teachers reported to this Board as incompetent.

The following standing committees were appointed for 1878:

*On Finance*—Messrs. Vermilye, Kelly, Beardslee, Bell, Halsted.

*On Teachers*—Halsted, Kelly, Place, Vermilye, Jelliffe.

*On Buildings*—Watson, Vermilye, Cohen, Manierre, Donnelly.

*On Supplies*—Traud, West, Hazeltine, Katzenberg, Manierre.

*On Auditing*—Dowd, West, Traud, Goulding, Donnelly.

*On By-Laws*—West, Beardslee, Walker, Watson, Donnelly.

*On Sites and Schools*—Jelliffe, Traud, Hazeltine, Manierre, Donnelly.

*On Course of Studies*—Walker, Place, Traud, Wheeler, Watson.

*On School Furniture*—Goulding, Cohen, Jelliffe, Dowd, Katzenberg.

*On Normal College*—Wickham, Halsted, Walker, Place, Bell.

*On Evening Schools*—Beardslee, Wickham, Bell, Place, Halsted.

*On Colored Schools*—Manierre, Dowd, Cohen, West, Katzenberg.

*On Warming and Ventilation*—Katzenberg, Cohen, Goulding, Wheeler, Watson.

*On Nautical School*—Hazeltine, Dowd, Bell, Wickham, Katzenberg.

*On Annual Report*—Wheeler, Walker, Goulding, Watson, Donnelly.

*On Nomination of Trustees*—Place, Halsted, Beardslee, Wickham, Goulding, Kelly, West, Wheeler, Traud.

*On Salaries and Economy*—Kelly, Halsted, Vermilye, Hazeltine, Walker, Wickham, Bell, Jelliffe, Manierre.

## BOOK NOTICES.

BICKNELL'S SCHOOLS, HOUSES AND CHURCH ARCHITECTURE. A. J. Bicknell & Co., New York.

This volume contains 23 plates and gives 26 plans and elevations of school houses and 25 plans, views, and sections of low priced churches. Everything that Mr. Bicknell presents to the public is intrinsically valuable. This volume is a contribution to a style of architecture that is really very much needed. The plates exhibit buildings that are within the range of means possessed by districts and small towns, who want a neat tasteful building at a small cost. Many of these have been approved of and are to be seen at Ashburnham, Mass. We believe the volume to be suggestive to all who are about to erect a school house and therefore commend all its features very heartily.

## Protection of Life from Fire.

Every parent should make each person in his house acquainted with the best means of escape, whether the fire breaks out at the top or bottom.

Inmates at the first alarm should endeavor calmly to reflect what means of escape there are in the house. If in bed at the time wrap themselves in a blanket or bedside carpet; open neither windows nor doors more than necessary; shut every door after them.

In the midst of smoke it is comparatively clear towards the ground, consequently progress through smoke can be made on the hands and knees. A silk handkerchief, worsted stocking, or flannel substance, wetted and drawn over the face, permits free breathing, and excludes to a great extent the smoke from the lungs. A wet sponge is alike efficacious.

In the event of being unable to escape either by the street door or roof, the persons in danger should immediately make their way to the front room window, taking care to close the front room window, taking care to close the door after them, and those who have the charge of the household should ascertain that every individual is there assembled.

Persons thus circumstanced are entreated not to precipitate themselves from the window while there remains the least possibility of assistance; and even in the last extremity a plain

rope is invaluable, or recourse may be had to joining sheets or blankets together, fastening one end round the bed-post or other furniture. This will enable one person to lower all the others separately, and the last may let himself down with comparatively little risk. Select a window over the doorway rather than over the area.

Do not give vent to the fire by breaking into the house unnecessarily from without, or if any inmate, by opening the doors or windows; make a point of shutting every door after you as you go through the house. For this purpose doors in closing the staircase are very useful.

Upon discovering yourself on fire, reflect that your greatest danger arises from draft to flames and from their rising upwards. Throw yourself on the ground, and roll over on the flame, if possible on the rug or loose drugget, which drag under you the tablecover, a man's coat, anything of the kind at hand will serve your purpose; scream for assistance, ring the bell, but do not run out of the room or remain in an upright condition.

Persons especially exposed to a risk of their dresses taking fire should adopt the precaution of having all linen and cotton fabrics washed in a weak solution of chloride of zinc, alum, or tung-state of soda.

THERE are 17,000 children between four and six years of age in the public schools of this city.

THE bones of Christopher Columbus have recently been found in the Cathedral of San Domingo.

SIX of the Pittsburgh (Pa.) railroad rioters were sentenced at Pittsburgh, to terms of imprisonment of from six years and ten months in the penitentiary down to six months in the workhouse. They were also fined from \$500 to \$5,000 each.

IN the Netherlands \$20,000 have been subscribed towards the expenses of sending a small, strong sailing ship to the west coast of Spitzbergen, with the object of reaching the mouth of the Yenissei. There is some talk of establishing a station on the north coast of Siberia to make scientific observations.

AN attempt was made by the students to blow up the Mills Seminary, at South Williamstown, Mass. A keg of gunpowder was buried in the cellar, but was discovered and removed. The incendiary students then threw a barrel of hot coals in the cellar to set fire to the building, but without success. Two students, the supposed ringleaders, have been apprehended.

THERE were never so many artists and art students in this city as there are this winter. The older men who have been here for years, and the new men who have just come back from their studies, now find in New York something of the "art atmosphere" whose absence has been hitherto deplored. A Munich master said not long ago that in the course of twenty-five years, German art students would be going to New York to be taught painting. He based his prediction upon the extraordinary ability of the young Americans at work in Munich.

ALREADY the new English system of public education tells favorably on the public morals. In illustration of this, The London *Sunday School Chronicle* quotes Mr. Wetherhead, governor of Holloway Prison, as saying that the number of juvenile criminals has steadily diminished, so that in place of 136 males and 21 females sent to that prison in 1869, there were in 1876 only 28 males and no females. It pays to look after the children. It is cheaper to educate them as scholars than to punish them as criminals. A schoolhouse costs less and does more for the public protection than a jail.

MR. STANLEY proposes that the Congo river be called the "Livingstone," after the famous missionary explorer, who discovered its head waters and gave it the name of "Lualaba." He says that the river affords a water way of 3,000 miles, broken indeed at intervals by rapids, but that it can be made navigable in almost its entire length. Ivory he reports as so abundant in much of the adjacent country that temples or idols, enclosures, and commonest domestic utensils are made of it. The entire plain is also covered with groves of the oil-palm. How to establish trade with the vast regions of Central Africa now discovered, is already the subject of serious consideration.

## Things to tell the Scholars.

THE child can spend but a small portion of his life in the school room; while there, it is of primary importance that he shall be led to acquire all the useful knowledge possible.

A STATUE of Linnæus is to be erected in the "Hop Garden" at Stockholm. The great naturalist is to appear surrounded by allegorical figures of Botany, Zoology, Mineralogy, and Medicine—the four sciences to which he devoted his attention.

A BOY of sixteen was received into the Leipzig hospital who gradually lost all sense of feeling, and, indeed, all other four senses, except that of sight in the right eye and of hearing in the left ear. The skin of the whole surface of the body was completely insensible to every kind of sensation.



It has been believed for years that a subterranean lake was to be found near Newburyport, Mass. This led to the sinking of a well, and clear water was found at a depth of fifty feet, in such quantities that there is talk of supplying the city with it.

Prof. Hitchcock, the geologist, has found at Wethersfield Dove, Conn., four fossil bird tracks, measuring a foot from heel to toe, and proportionately wide, which he thinks he must have been made by a bird of at least twelve feet high. When did it live?

EIGHTY-THREE murderers paid the death penalty in this country during the year 1877; and of these forty-seven were white, thirty-four colored, one an Indian, and one a Chinaman. Pennsylvania furnished sixteen, and South Carolina twelve of these penal executions, and New York State but three.

THE average number of drinking saloons throughout the United States is said to be one for every two hundred and eighty inhabitants, counting men, women and children. New York State furnishes 28,854 of these saloons, which is nearly twice the number of any other state. Temperance in this country has plenty of work yet on hand.

THE text books on Natural Philosophy say, that a tallow candle shot from a gun would go through a board. A Mr. Bloudell was acting in a drama in a Baltimore theatre. A blank cartridge was fired at him, and a piece of tallow that had adhered to the charge passed through his nose.

BUSINESS DISASTERS.—In the single month of December the total number of failures and assignments reported to the Register in New York was one hundred. In the case of eighty nine of these failures the liabilities or indebtedness amounted to \$7,704,391, and the assets or means of paying to \$4,118,777. Nearly one-half of the whole indebtedness will thus be a total loss. How truly riches are deceitful! What changes are made by these business disasters in the circumstances and condition of multitudes! What admonitions to all to lay up enduring treasures in heaven, rather than on the earth!

A SPLENDID specimen of a reptile-toothed bird, was found a few months ago at Pappenheim, and was offered at first for about \$6,000 to the Munich Museum, but not purchased. When it was found how exceedingly well preserved it was the price was raised to about \$9,000, and the Germans are greatly congratulating themselves that it has been purchased for a museum at Frankfurt, and so will not pass out of the country.

THE ILLINOIS State Teachers' Association at its late meeting formally resolved that "it again endorses, with emphasis and without equivocation, the co-educational system of schools, primary, secondary and university, now in successful operation in this State believing that the true interests—physical, mental and moral, of both sexes are far better observed by this plan than by the system of separate instruction."

THE investigations made by M. Reboux have revealed the probable fact that, at a former period, the bed of the Baltic sea was occupied by an immense forest, which in fact spread over nearly the whole northern continent. Dredging, carried on at a depth of six or seven feet below the sea bottom, has brought to light two species of conifers, a poplar, a chestnut and various other trees. From the conifers, M. Reboux thinks, ran the resin which, through being buried in the earth, has become changed into amber, the largest quantity of this gum appearing to have been derived from the pinus tucclaus. More than 300 specimens of objects have been found imbedded in this gum, including insects—reptiles, plants, leaves, grains, shells, fruit, &c.

THE apparatus used in Germany for noting the temperature of the earth is, it appears, of a peculiar construction, as compared with that employed in other countries. It consists principally of rectangular tube buried permanently in the earth, within which five rectangular prisms of wood are placed, one above the other, at different depths in the ground, and which, by a simple arrangement, can be easily and quickly drawn up. Each of these tubes contains a thermometer, and there is a hole in the side of the main tube, opposite to the bulb of the thermometer, where the wood work is cut away, and the opening closed by plate of thin sheet copper, whose temperature may be presumed to be the same as that of the adjacent ground. The depths at which the thermometer's bulbs remain are four, eight, twelve, sixteen, and twenty feet; and, as showing the efficiency and adaptation of this arrangement for the purpose, it is found, as the result of several years' observations, that the time required for heat to penetrate to a depth of one meter is, on the average, twenty-one days.

TIN FROM EARLY BRITONS.—The amount of tin required in ancient times when Egypt, Greece, and Italy were, one after another, in the full glow of their prosperity, must have been great. During preceding times—during what is called

the bronze age—we may pass over all inquiry about the use of it, as bronze was then confined, probably, to the making of small ornaments or weapons for the chase or war. But when, not to speak of all kinds of vessels for domestic use, larger works were undertaken, ranging in from the Colossus of Rhodes down to statuette for a banqueting-room and in number reaching to the extraordinary amount of 3,000 statues in more than one single town in Greece, the demand for tin must have been enormous, for, as Mr. Fortnum tells us in his excellent introduction to the Catalogue of Bronzes in the South Kensington Museum, "the general result of analyses of several examples of Greek and Roman bronze has shown a composition of 88 or 90 parts of copper to 12 or 10 of tin." \* \* \* There seems to be little doubt that the chief district whence the Phoenicians got their tin in Britain, lay in the neighborhood of Mount's Bay, in the country between Truro and Land's End. From a well-known passage in Strabo it would seem that the tin in his time, after being melted and refined, was carried to St. Michael's Mount, there to be purchased by the foreign merchants, who then carried it to the neighboring Continent, and conveyed it "across Gaul for about 30 days, to the outlet of the river Rhone."

#### WOODCHUCKS.

We find in the *Albany Journal* the following original composition, which evidently cost its author no small effort to find both ideas and expressions: the double task is plainly seen; now he gets the "happy thoughts," and next the felicitous expression thereof:

Woodchucks is a very curious animal. It is made of hair and eyes and has two front teeth, and can see a man with a gun when the eyes are shut and bolted. I have seen a dog shake a woodchuck till both were black in the face. A woodchuck can snivel up his nose, show his teeth and look as homely as I can without trying. They sit on one end and eat with the other. A woodchuck can get home faster than a gun can shoot. He is round all over, except his feet which are black. When eaten they retain the flavor of their nests, and seem to have been cooked without being pared. A fat woodchuck, when eat properly, is no laughin' matter. They come under the head of "domestic animals," and think there ain't no place like home when a dog goes for one of 'em.

A MAGNIFICENT diamond, weighing 52½ carats, it is reported, was found in the South African diamond fields, in October, in the gully of Dutoitspan. It is said to be a pure white-frosted stone without spot or flaw. The finders refused to take \$15,000 for it. A diamond of 100 carats was found in the Kimberly Mine, but rather inferior in quality.

THE last earthquake at the West is supposed to have radiated from a locality in Nebraska that has been regarded as the site of a volcano. The seat of disturbance is on the banks of the Missouri, in Dixon County, about thirty-six miles from Sioux City. A bluff about 1,100 feet long and 160 feet high sloping at an angle of 60 to 80 degrees toward the river, is at present the place where the phenomena are most exhibited, but other bluffs at a few miles' distance have been similarly affected. Flames sometimes broke forth, occasionally at night steam escaped from crevices. On digging into the bluff, intense heat stopped the work after proceeding a few feet.

#### MORE SATELLITES TO BE DISCOVERED.

An astronomer says that the number of the satellites of the heavenly bodies probably varies in geometrical progression, of which the ratio is two for the great planets from the earth. Thus we have but one moon, Mars twice as many—two; Jupiter twice as many as Mars—four; Saturn twice as many as Jupiter—eight. It may be supposed, according to this, that Uranus has twice as many moons as Saturn—sixteen, and consequently that Neptune has thirty-two—it being impossible to see these owing to the immensity of distance from the earth. M. Frederic Petit, of the Observatory of Toulouse, advocates the existence of a second satellite of the moon, which he believes he has seen several times. If the diameter of the satellites of Mars is as small as reported, such bodies could easily revolve round the moon unnoticed by astronomers on the earth and their presence might account for some of the known irregularities in the moon's motion.

#### The Kindergarten.

The following object lesson is by Miss Hess, a pupil in Mrs. Louise Pollock's Kindergarten Normal Institute in Washington, D. C. It was used in connection with the first gift, the six soft balls of the colors of the rainbow:

"Then, child of the fair earth! which yet  
Smiles with each charm endowed,  
Bless thou his name whose mercy set  
The rainbow in the cloud!"

Good morning, little "smiling faces." I am so glad to see you all here to-day, for I want to tell you the story I promised you yesterday. Another time we must not become so interested in one block lesson, for all else is forgotten. The story I have to tell you is not very long, and is something about the rainbow. How many have ever seen the rainbow? You all have, and you wondered where the beautiful colors came from, didn't you?

Well, we will speak of the sun first, for if it were not for the sun no rainbow would ever appear; you know this to be true, because when it rains after the sun is set, no bow is seen. When we are coming to school in the morning, and see the sun shining on the trees and grass, it looks white to us, but it really contains all the colors. This was proved by Sir Isaac Newton, and you could do the same thing. Some day, when the sun is shining brightly, you take a large piece of pasteboard and make a small hole in it, holding it up so as to face the sun, now darken the room a little, so that only a few rays of light will come through the hole, these rays will pass to the floor and form a spot of white light. Ask mamma please to let you have a glass prism off the glass chandelier and hold it before the hole in the pasteboard, the rays of light will be refracted and spread out in the form of a long band, and instead of being white, will contain all the colors of the rainbow, which are violet, indigo, blue, green, yellow, orange and red.

Now we have found out that the sun contains the rainbow colors, let us find out how the rainbow itself is formed. You have often heard your mamma speak of a sun-shower. Well, we call it that because while the rain falls the sun shines, and when this occurs we most always have a rainbow because the sunlight, containing all the colors, reflects on the little rain drops which form prisms like your little glass, and thus this out the colors. The red rose looks red because it absorbs all the other colors, and only throws out the red, just so with the blue, orange and other colored objects.

The next time you go down town with mamma, if the sun is shining, stop in front of the Fountain with your back to the sun, and you will see a rainbow in the spray of water.

If it ever rains while the sun is shining, and no bow appears, don't be disappointed, and think we will never see it again—the only reason we didn't see it is because Mr. Sun moved faster than the rain that day, and was too near his rest to reflect his colors.

Mr. Oliver, 103 Beekman St., has made a decided improvement in the household article, a tea and coffee pot. It consists of a cylindrical receptacle, which is screwed to the bottom, and can be removed to allow of cleansing. This centre chamber becomes a strainer and produces fine tea and coffee without failure. And when it is desired to remove the spent leaves or grounds, the cook has only to withdraw a slide from the chamber. This seems a valuable improvement, and as such we commend it to the trial of our readers.

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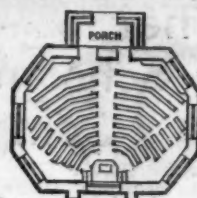
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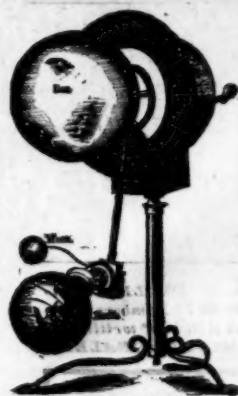
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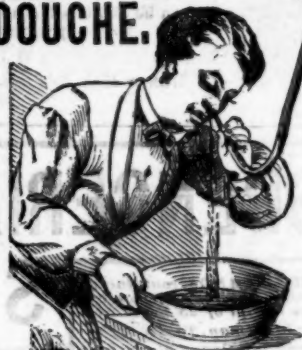
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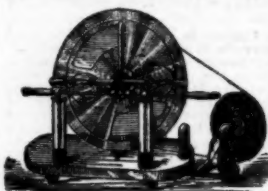
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And to all who, in consequence of overwork, or any other cause, find themselves suffering from a gradually increasing brain and nervous exhaustion, and who feel that they are slowly losing vitality and the power to do their best.

## THE Compound Oxygen Treatment.

**COMPOUND OXYGEN** is an agent which acts on scientific principles, and in complete harmony with natural laws and forces. It assists nature to remove the effete carbonaceous matters which have accumulated in the system in consequence of our bad habits of respiration, and thus restores to her the normal control of all the vital activities.

**COMPOUND OXYGEN** does not cure by the substitution of one disease for another, as when drugs are taken, but by an orderly process of re-vitalization. To the overworked Student or Professional Man, who finds himself slowly losing vitality and his power to his best, Compound Oxygen offers an almost certain means of relief and restoration.

Consumption, Chronic Catarrh, Oozes, Asthma, Dyspepsia, Diabetes Paralysis, and some of the most painful Nervous Disorders have yielded, in a very large proportion of cases, to its re-vitalizing a curative power. **WHO HAVE BEEN CURED BY COMPOUND OXYGEN?** We could give the names of a large number of persons in all parts of the country, who have found relief and cure in this new treatment, but have only room for the following, to whom, by permission, we here refer: Hon. S. FIELD, Judge of the United States Supreme Court, and his accomplished wife; Mrs. HALLIE KILBURN; Judge SAMUEL SMITH, of New York; Hon. MONTGOMERY BLAIR; Ex-Governor BOREMAN, West Virginia; Hon. WILLIAM D. KELLEY; T. S. ARTHUR and Gen. FITE HENRY WARREN.

The case Mr. T. S. ARTHUR, the well known American author, is a most remarkable one, as will be seen from the following, which is taken from Arthur's Illustrated Home Magazine of July, 1877. He says:—

"Nearly seven years have passed since we began using this treatment. Up to that period our health had been steadily declining; not in consequence of any organic disease, but from overwork and consequent physical and nervous exhaustion. The very weight of the body had become tiresome to bear, and we regarded our days of earnest literary work as gone forever. But almost from the very beginning of our use of the Compound Oxygen, an improvement began. There was a sense of physical comfort and vitality not felt for years, and this slowly but steadily increased. Literary work was resumed in a few months, the mind acting with a new vigor, and the body free from the old sense of weariness and exhaustion. A better digestion, an almost entire freedom from severe attacks of nervous headache from which we had suffered for twenty years, and from a liability to take cold on the least exposure, were the results of the first year's use of the new treatment; and this benefit has remained permanent. As to literary work in these years, we can only say that it has been constant and earnest; and if the acceptance with the public may be regarded as any test of its quality, it is by far the best work that we have done."

**OXYGEN HOME TREATMENT.** This can be sent any distance in a small and compact package. Price for two months' supply, with inhaling apparatus, and full and explicit directions, \$15.00.

A treatise on Compound Oxygen, its mode of action and results, to which are appended a large number of testimonials to most remarkable cures, will be sent free by mail to all who write to us for it.

**STARKEY & PALEN,**

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